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# **APPRENTICESHIP TRAINING**

## **Roofer Program**

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## **Roofer**

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## **Apprenticeship and Industry Training System**

Apprenticeship is post-secondary education with a difference. It helps ensure Alberta has a steady supply of highly-skilled employees, the foundation of our economy's future health and competitiveness.

Apprentices in more than 50 trades and crafts spend between one and four years learning their trade - 80% of the time on the job under the supervision of a certified journeyman or qualified tradesperson. The balance of the program is technical training in the theory, skills and technologies of their trade.

To become certified journeymen apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board (the Board) and a network of local and provincial industry committees.

The graduate of the Roofer apprenticeship training is a journeyman who will be able:

- understand the principles and practices of roofing.
- know the characteristics and to understand the actions and interactions of roofing materials.
- interpret plans and specifications and to layout and develop projects accordingly.
- calculate material and quantities.
- use hand tools and powered equipment in a proper and safe manner.
- relate to the work of other tradesmen in the Construction industry.
- perform assigned tasks in accordance with quality and production standards required in industry.

### **Apprenticeship and Industry Training Committee Structure**

While government supports Alberta's apprenticeship and industry training system, it is driven by industry, a term which includes both employers and employees. The Alberta Apprenticeship and Industry Training Board, with the support of Alberta Learning, oversees the system. But the system relies on a network of industry committees. These committees include local and provincial apprenticeship committees (LACs and PACs) in the designated trades and occupational committees in the designated occupations, as well as other committees such as provisional committees established before the designation of a new trade or occupation comes into effect. All these committees are composed of equal numbers of employers and employees. The network of industry committees is the foundation of Alberta's apprenticeship and industry training system.

### **Local Apprenticeship Committees (LAC)**

Wherever there is activity in a trade, the Board can set up a LAC. The Board appoints equal numbers of employees and employers for terms of up to three years. The committee appoints a member as presiding officer. Local Apprenticeship Committees:

- monitor the apprenticeship system, and the progress of apprentices in their trade, at the local level.
- help settle certain kinds of issues between apprentices and their employers.
- recommend improvements in apprenticeship training and certification to their trade's provincial apprenticeship committee.
- make recommendations to the Board regarding the appointment of members to their trade's PAC.

## Provincial Apprenticeship Committees (PAC)

The Board establishes a PAC for each trade and, based on PAC recommendations, appoints a presiding officer and equal numbers of employees and employers for terms of up to three years. Most PACs have nine members. Provincial Apprenticeship Committees:

- identify the training needs and content for their trade.
- recommend to the Board the standards for training and certification for their trade.
- monitor the activities of local apprenticeship committees in their trade.
- make recommendations to the Board about the designation of trades and occupations.
- determine whether training of various kinds is equivalent to training provided in an apprenticeship program in the trade.
- may participate in resolving any apprenticeship-related disputes between employers and employees.

### Roofer PAC Members

Mr. R. James .....	Calgary .....	Presiding Officer
Mr. N. Sims Sr. ....	Calgary .....	Employer
Mr. S. Teal .....	Calgary .....	Employer
Mr. M. Jarosch .....	Edmonton .....	Employer
Mr. M. Lloyd .....	Edmonton .....	Employer
Mr. C. Morgan .....	Calgary .....	Employee
Mr. J. Fraser .....	Edmonton .....	Employee
Mr. J. Lindberg .....	Edmonton .....	Employee
Mr. R. Tanaka .....	Lethbridge .....	Employee

### The Alberta Apprenticeship and Industry Training Board (Board)

The mandate of the Alberta Apprenticeship and Industry Training Board relates to the standards and requirements for training and certification in programs under the *Apprenticeship and Industry Training Act*. The Board provides advice to the Minister of Learning on the training and certification of people in designated trades and occupations and on the needs of the Alberta labour market for skilled and trained persons. The Board also makes orders and regulations respecting standards and requirements for apprenticeship programs and the training of apprentices and for training and certification in designated trades and occupations, and the criteria or requirements for granting and recognizing trade and other certificates.

The 13-member Board consists of a chair, eight members representing trades and four members representing other industries. The trades and other industry members are equally represented by employer and employee representatives.

### Safety Education

Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees and the public. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to or cause an accident or injury.

It is generally recognized that a safe attitude contributes to an accident free environment. Everyone will benefit as a result of a healthy, safe attitude towards prevention of accidents.

A tradesperson is possibly exposed to more hazards than any other person in the work force and, therefore, should be familiar with and apply the Occupational Health and Safety Act and Regulations dealing with personal safety and the special safety rules applying to each task.



## **Legal and Administrative Aspects of Safety**

Accident prevention and the provisions of safe working conditions are the responsibilities of an employer and employee.

### **Employer's Responsibilities**

The employer is responsible for:

- providing and maintaining safety equipment and protective devices.
- ensuring proper safe work clothing is worn.
- enforcing safe working procedures.
- providing safeguards for machinery, equipment and tools.
- observing all accident prevention regulations.
- training employees in the safe use and operation of equipment.

### **Employee's Responsibilities**

The employee is responsible for:

- working in accordance with the safety regulations pertaining to the job environment.
- working in such a way as not to endanger themselves or fellow employees.

### **Workplace Health and Safety's Responsibilities:**

Workplace Health and Safety (Alberta Human Resources and Employment) will conduct periodic inspections of the workplace to ensure that safety regulations for industry are being observed.

## **Technical Training Establishment**

Alberta Learning, Apprenticeship and Industry Training offer your apprenticeship training program. Staff and facilities for delivering the program are supplied by the Northern Alberta Institute of Technology.

**Procedures For Recommending  
Revisions To The Course Outline**

Apprenticeship and Industry Training, Industry Programs and Standards has prepared this course outline in partnership with the Roofer Provincial Apprenticeship Committee.

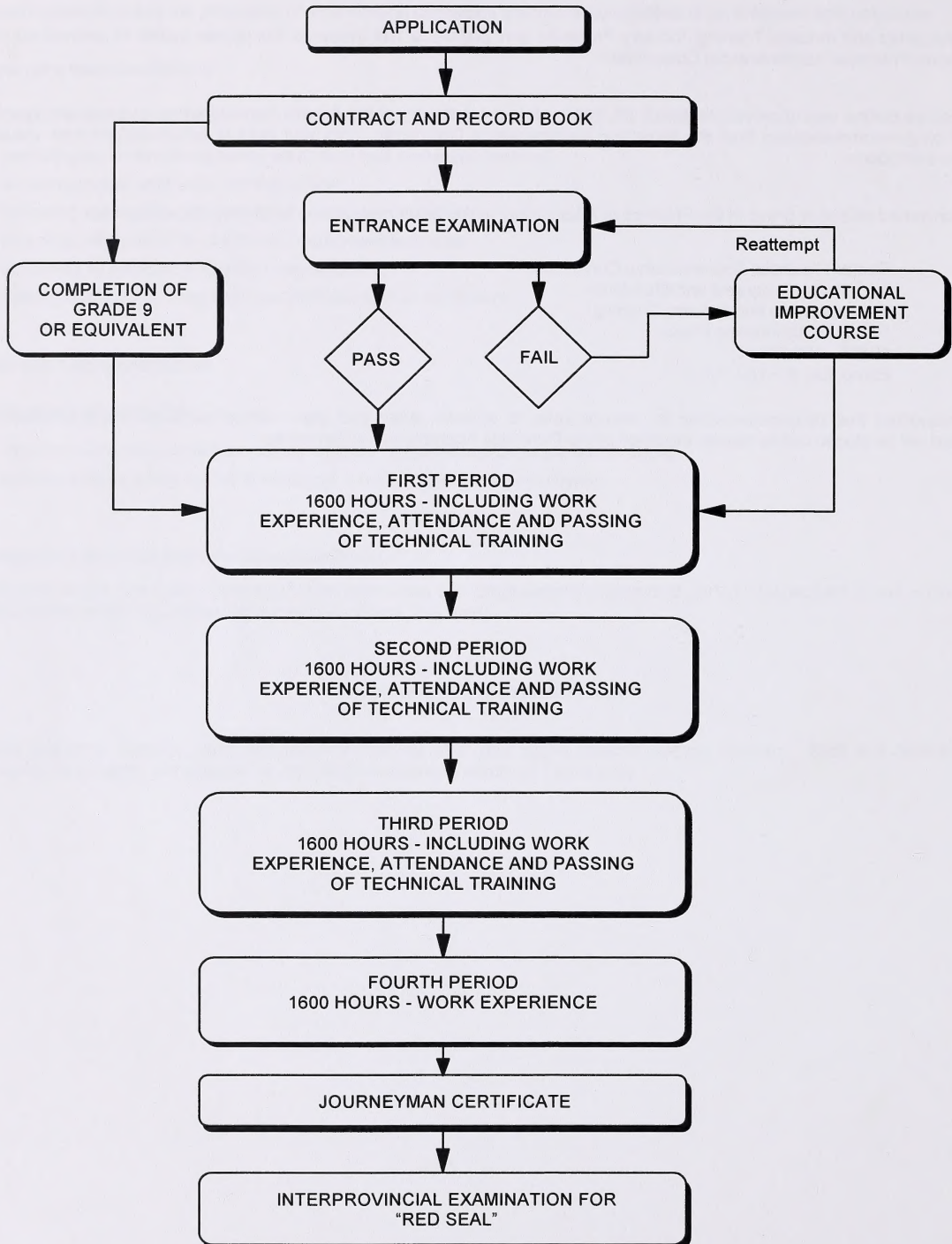
This course outline was approved on March 26, 2004 under the authority of the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. Valuable input is acknowledged from industry and the institutions.

Any concerned citizen or group in the Province of Alberta may make recommendations for change by writing to:

Roofer Provincial Apprenticeship Committee  
c/o Industry Programs and Standards  
Apprenticeship and Industry Training  
10th floor, Commerce Place  
10155 - 102 Street  
Edmonton, AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations received will be placed before regular meetings of the Provincial Apprenticeship Committee.

### Apprenticeship Route Toward Certification





## Roofer Training Profile

### FIRST PERIOD

(6 Weeks 30 Hours Per Week – Total of 180 Hours)

#### SECTION ONE

##### INTRODUCTORY THEORY: LOW & STEEP SLOPE

47 Hours



A	B	C
Introduction to the Roofing Industry 1 Hour	Terminology 1 Hour	Safe Work Practices and Safety Regulations 8 Hours
D	E	F
Introduction to W.H.M.I.S. (Workplace Hazardous Materials Information System) 1 Hour	Transportation of Dangerous Goods Control 1 Hour	Workplace Health and Safety (OHS) and Alberta Construction Safety Association 1 Hour
G	H	I
Human Resources Canada 1 Hour	Apprenticeship and Industry Training Act 1 Hour	Roof Structures and Loading 2 Hours
J	K	L
Types of Roof Structures 2 Hours	Construction Features 1 Hour	Loading and Operation of Truck 1 Hour
M	N	O
Introduction to Roofing Tools and Equipment 8 Hours	Roofing Materials 12 Hours	Premature Roof Failures 2 Hours
P	Q	
Introduction to Composition Shingles 2 Hours	Introduction to Softwood Shingles 2 Hours	

#### SECTION TWO

##### SHOP WORK: FIELD SEAMS & STEEP ROOFING

83 Hours



A	B	C
Safety 8 Hours	Work Ethics Ongoing	Shop Introduction 4 Hours
D	E	F
Roof Inspections, Repair and Surveys (Off Campus) 6 Hours	Kettles and Burners 3 Hours	Low Slope Roofs 32 Hours
G	H	
Asphalt Shingles 15 Hours	Softwood Shingles 15 Hours	

#### SECTION THREE

##### BASIC TRADE MATHEMATICS

20 Hours



A	B	C
Calculate Using Whole Numbers 2 Hours	Calculate Using Fractions 2 Hours	Calculate Using Decimals 2 Hours
D	E	
Calculate Using Percentages 2 Hours	Calculate Perimeter, Areas and Volumes 12 Hours	

**SECTION FOUR****BLUEPRINT READING:  
ORTHOGRAPHIC DRAWINGS**

20 Hours

**A**

Blueprints and Their Uses

2 Hours

**B**

Types of Drawing Views

4 Hours

**C**

Scaling Blueprints

2 Hours

**D**Interpret Symbols and  
Abbreviations

12 Hours

**SECTION FIVE****FIRST AID FOR ROOFERS**

10 Hours

**A**Primary Survey  
Considerations for Adult  
Emergencies Only

4 Hours

**B**Secondary Survey  
Considerations

6 Hours

**SECOND PERIOD****(6 Weeks 30 Hours Per Week – Total of 180 Hours)****SECTION ONE****INTERMEDIATE THEORY: LOW  
SLOPE MEMBRANES**

48 Hours

**A**

Safety

12 Hours

**B**Tools and Equipment  
Operations

1 Hour

**C**

Roofing Specifications

1 Hour

**D**

Roof Failures

2 Hours

**E**

Re-roofing

2 Hours

**F**Waterproofing and  
Dampproofing

2 Hours

**G**Hot Asphalt—Built-up  
Roofing—Introduction

6 Hours

**H**Roofing Application for Other  
Membranes

12 Hours

**I**Roofing During Inclement  
Weather

1 Hour

**J**

Roof Drainage

1 Hour

**K**

Softwood Shakes

4 Hours

**L**

Rigging

4 Hours

**SECTION TWO****SHOP WORK: DETAIL WORK &  
STEEP ROOFING**

96 Hours

**A**

Safety

8 Hours

**B**

Tools and Equipment

Ongoing

**C**Low Slope Roof  
Applications

40 Hours

**D**Rigging and Rigging  
Equipment

10 Hours

**E**

Steep Roof Applications

38 Hours

**SECTION THREE****TRADE MATHEMATICS:  
INTRODUCTORY GEOMETRY**

18 Hours

**A**

Mathematics

9 Hours

**B**

Estimating

9 Hours

**SECTION FOUR****INTERPRETING BLUEPRINTS**

18 Hours

**A**

Blueprint Interpretation

6 Hours

**B**

Construction Details

12 Hours

**THIRD PERIOD**  
(6 Weeks 30 Hours Per Week – Total of 180 Hours)

**SECTION ONE**

**ADVANCED THEORY & METAL ROOFING**  
44 Hours



A	B	C
Safety 5 Hours	Metal Roof 6 Hours	Preventative Roof Maintenance 2 Hours
D	E	F
Trade Science 9 Hours	Organizing the Roofing Crew 12 Hours	Steep Roofing Materials—Tiles 6 Hours
G		
Flashings and Accessories 4 Hours		

**SECTION TWO**

**SHOP WORK: METAL ROOFING & FLASHING**  
96 Hours



A	B	C
Safety 8 Hours	New Materials 12 Hours	Steep Roof Applications 16 Hours
D	E	F
Maintenance 6 Hours	Metal Roofs 20 Hours	Sheet Metal Shop Work 34 Hours

**SECTION THREE**

**TRADE MATHEMATICS: ADVANCED GEOMETRY & MATERIAL TAKE-OFFS**  
20 Hours



A
Mathematics 20 Hours

**SECTION FOUR**

**BLUEPRINT READING: ESTIMATING**  
20 Hours



A
Blueprint Interpretation 20 Hours

NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training



**FIRST PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
COURSE OUTLINE**

**UPON SUCCESSFUL COMPLETION OF THIS COURSE THE APPRENTICE SHOULD BE ABLE TO PERFORM THE  
FOLLOWING OUTCOMES AND OBJECTIVES.**

**SECTION ONE: .....INTRODUCTORY THEORY: LOW & STEEP SLOPE..... 47 HOURS**

**A. Introduction to the Roofing Industry ..... 1 Hour**

**Outcome:**        *Describe the minimum standards and trade associations for roofing in Alberta.*

1. Explain the need for minimum roofing standards as required by the ARCA.
2. Explain the conditions contained regarding guarantee offered by the ARCA and the CRCA.
3. Know and describe the roofing inspection responsibility.
4. Explain the meaning of good work ethics.

**B. Terminology ..... 1 Hour**

**Outcome:**        *Communicate with industry related people and customers using industry standard terminology for materials, tools and building components.*

1. Demonstrate the use of proper terminology.
2. Name standard terms for materials, functions and components as applied to first period training.

**C. Safe Work Practices and Safety Regulations ..... 8 Hours**

**Outcome:**        *Demonstrate safe work practices at all times.*

1. List and describe proper Personal Protective Equipment (PPE).
2. Demonstrate safe work practices relating to construction sites.
3. List and describe safe work practices regarding roofing equipment and materials.
4. Identify the classes and properties of fires and fire suppression equipment.
5. Explain the responsibility of following and maintaining "Public Safety" as described by legislated restrictions.

**D. Introduction to W.H.M.I.S. (Workplace Hazardous Materials Information System) ..... 1 Hour**

**Outcome:**        *Define the role of WHMIS on the job-site.*

1. Describe what WHMIS is and its elements.
2. Define and distinguish the various types of WHMIS labels.
3. Explain what a Material Safety Data Sheet (MSDS) is and where to find the information.

**E. Transportation of Dangerous Goods Control Act ..... 1 Hour****Outcome:** *Identify the role of TDG in regards to the roofing industry.*

1. Explain the employer's responsibility with regard to training.
2. Explain the employee's responsibility with regard to training.
3. Explain the exemptions under the TDG regulations as they pertain to the roofing industry.

**F. Workplace Health And Safety (WHS) and Alberta Construction Safety Association (ACSA)..... 1 Hour****Outcome:** *Describe the roles of various provincial government agencies with regard to safety within the trade.*

1. Identify the Safety Regulations as they apply to the safe work practices in the roofing trade.
2. Explain the function and purpose of the branch.

**G. Human Resources Canada ..... 1 Hour****Outcome:** *Describe the function of the department and its relation to the roofing apprentice.*

1. Explain the function of the department and how service is provided.
2. Describe how to apply for benefits and the conditions for receiving benefits.

**H. Apprenticeship and Industry Training Act..... 1 Hour****Outcome:** *Describe the function of the department and its relation to the roofing apprentice.*

1. Explain the role and function of the act and, its organizational pattern.
2. Describe the provisions for receiving input from management and labour.
3. Describe the purpose and use of the record book.

**I. Roof Structures and Loading..... 2 Hours****Outcome:** *Describe and identify different types of materials used for roof decks and the safe procedure for the loading of roof decks.*

1. Describe the types of materials used for roof decking including:
  - a) wood;
  - b) concrete;
  - c) steel;
  - d) gypsum;
  - e) composite.

2. Describe deck preparation techniques prior to roof application including:
  - a) covering of holes;
  - b) proper securement;
  - c) reinforcement of openings.
3. Describe the safety procedures and practices to be followed when loading materials and equipment on the roof deck.
4. Identify the strong and weak areas of a roof deck in relation to roof loading.
5. Demonstrate proper protection of loaded materials.

**J. Types of Roof Structures ..... 2 Hours**

**Outcome:** *Describe the differences between residential type structures and commercial/industrial type structures and identify various styles and shapes.*

1. Describe the primary differences between the roofs of residential buildings and those of commercial or industrial buildings in relation to terminology.
2. List and describe common types of roof styles in both steep and low slope designs.

**K. Construction Features ..... 1 Hour**

**Outcome:** *Identify features directly related to roofs and their construction.*

1. List and describe construction features found on various roof types.

**L. Loading and Operation of Truck ..... 1 Hour**

**Outcome:** *Describe the sequences used for loading materials and equipment on the truck.*

1. Describe the sequence for loading material on the truck.
2. Describe the sequence and distribution of loading equipment on the truck.
3. Identify safety procedures for loading and operating loading equipment.

**M. Introduction to Roofing Tools and Equipment ..... 8 Hours**

**Outcome:** *Identify and understand the use, maintenance and safety of roofing tools and equipment.*

1. Identify and understand the use of small hand tools.
2. List and describe the various types of lifting equipment including the specific use and safety requirements of each
3. Identify and understand the use of on-deck roofing equipment.
4. Identify and understand the use of asphalt melting equipment and asphalt pumps.



**N. Roofing Materials ..... 12 Hours**

**Outcome:** *Identify, list and explain the various materials used in low slope systems.*

1. List and describe the materials used in BUR.
2. List and describe the materials used in SBS/APP systems.
3. List and describe the materials used in single ply systems.
4. List and describe new materials as they become available.

**O. Premature Roof Failure..... 2 Hours**

**Outcome:** *List and describe the different causes and effects of premature roof failures as well as describing various repair techniques.*

1. Identify common examples of premature roof failure.
2. Describe methods used to counteract premature roof failure.
3. List and describe repair techniques for premature roof defects.

**P. Introduction to Composition Shingles ..... 2 Hours**

**Outcome:** *Describe the various types and installation techniques for composition shingles.*

1. Identify the types of composition shingles available.
2. Describe installation techniques including underlayment and flashing requirements, new roofing and re-roofing.
3. Describe the need for proper ventilation on steep roofs.

**Q. Introduction to Softwood Shingles..... 2 Hours**

**Outcome:** *Describe the various types and installation techniques for softwood shingles.*

1. Identify the types and grades of softwood shingles available.
2. Describe installation techniques including underlayment and flashing requirements, new roofing and re-roofing.
3. Describe the need for proper ventilation on steep roofs.

**SECTION TWO:.....SHOP WORK: FIELD SEAMS & STEEP ROOFING.....83 HOURS****A. Safety ..... 8 Hours**

**Outcome:** *Demonstrate safe work practices as it applies to shop work.*

1. Demonstrate safe work practices in shop work.
2. Demonstrate proper use of Personal Protective Equipment (PPE).
3. Complete fire extinguisher training as it relates to low slope roofs.

**B. Work Ethics ..... Ongoing****Outcome:**     *Demonstrate good work ethics in the shop.*

1.     Demonstrate good work ethics in the shop.
2.     Demonstrate a willingness to cooperate in shop projects requiring group work.

**C. Shop Introduction ..... 4 Hours****Outcome:**     *Practice and demonstrate aptitude in the use of shop tools.*

1.     Demonstrate safe handling and use of hand tools.
2.     Demonstrate safe use and handling of electrical power tools.
3.     Demonstrate safe use and procedures for on-deck equipment.

**D. Roof Inspection, Repair and Surveys (Off Campus) ..... 6 Hours****Outcome:**     *Assess damage to existing roofs and repair work required.*

1.     Demonstrate an understanding of roof inspection with regard to assessing damage and evaluating repairs.
2.     Develop hand skills for applying roofing materials.

**E. Kettles and Burners ..... 3 Hours****Outcome:**     *Demonstrate proper start-up, use and shut down of asphalt melting equipment.*

1.     Demonstrate safe practices for the start-up of kettle operations.
2.     Practice safe work procedures when handling and using "hot" products.
3.     Demonstrate safe practices for the shutdown of asphalt melting equipment.

**F. Low Slope Roofs ..... 32 Hours****Outcome:**     *Establish proficiency with applying low slope membranes and using low slope on-deck and safety equipment.*

1.     Demonstrate the safe use of low slope roofing equipment.
2.     Demonstrate proficiency in applying low slope roofing materials including BUR, SBS, EPDM, PVC and other new materials.

**G. Asphalt Shingles ..... 15 Hours****Outcome:**     *Establish proficiency in applying steep slope materials (asphalt shingles) and using steep slope safety equipment.*

1.     Establish proficiency in applying asphalt shingle roofs.

2. Demonstrate the correct use of steep roofing safety systems.

**H. Softwood Shingles ..... 15 Hours**

**Outcome:**     *Establish proficiency in applying steep slope materials (softwood shingles) and using steep slope safety equipment.*

1. Establish proficiency in applying softwood shingles on steep roofs.
2. Demonstrate the correct use of tools and safety equipment.

**SECTION THREE: ..... BASIC TRADE MATHEMATICS ..... 20 HOURS**

**A. Calculate Using Whole Numbers ..... 2 Hours**

**Outcome:**     *Solve mathematical problems using basic arithmetic.*

1. Solve mathematical problems using whole numbers.
2. Demonstrate proficiency in the use of calculators.

**B. Calculate Using Fractions ..... 2 Hours**

**Outcome:**     *Solve problems using fractions.*

1. Solve mathematical problems using fractions.

**C. Calculate Using Decimals ..... 2 Hours**

**Outcome:**     *Solve mathematical problems using decimal numbers.*

1. Solve mathematical problems using decimal numbers.
2. Solve mathematical problems using the metric system.

**D. Calculate Using Percentages ..... 2 Hours**

**Outcome:**     *Solve problems using ratios and proportions.*

1. Solve problems using percentages.
2. Solve problems using ratios and proportions.
3. Solve "story-type" problems.

**E. Calculate Perimeters, Areas and Volumes ..... 12 Hours**

**Outcome:**     *Calculate geometrical trade related problems.*

1. Perform calculations using perimeter formulae on basic geometric shapes.



2. Perform calculations using area formulae on basic geometric shapes.
3. Perform calculations using volume formulae on basic geometric shapes.

#### SECTION FOUR: ..... BLUEPRINT READING: ORTHOGRAPHIC DRAWINGS ..... 20 HOURS

##### A. Blueprints and Their Use ..... 2 Hours

**Outcome:** *Understand the need for blueprints in the construction industry.*

1. Explain the basic components of a set of working drawings.
2. Explain the relationship between blueprints and specifications.

##### B. Types of Drawing Views ..... 4 Hours

**Outcome:** *Draw and interpret various drawing styles.*

1. Draw and interpret orthographic drawings.
2. Graphically describe the various lines used in working blueprints.

##### C. Scaling Blueprints ..... 2 Hours

**Outcome:** *Read scale rulers in metric and imperial scales.*

1. Read scale rulers using imperial dimensions.
2. Read scale rulers using metric dimensions.
3. Draw lines using both systems.

##### D. Interpret Symbols and Abbreviations ..... 12 Hours

**Outcome:** *Understand the symbols and abbreviations used in blueprints and, interpret drawings.*

1. Identify symbols on a set of working drawings.
2. Decipher abbreviations on a set of working drawings.
3. Interpret details from a set of working drawings.

#### SECTION FIVE: ..... FIRST AID FOR ROOFERS ..... 10 HOURS

##### A. Primary Survey Considerations for Adult Emergencies Only ..... 4 Hours

**Outcome:** *Perform emergency first aid for adult emergencies.*

1. Understand emergencies first aid ABC's (Airways, Breathing and Circulation).

**B. Secondary Survey Considerations..... 6 Hours**

**Outcome:**        *Understand the prevention of falls and the treatment of secondary injuries.*

1.     Demonstrate the treatment of musculoskeletal injuries.
2.     Review the prevention of falls and treatment of fall related injuries.
3.     Demonstrate the treatment of soft tissue injuries.
4.     Review the treatment of asphalt burns.
5.     Review the treatment of environmental injuries.

**SECOND PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
COURSE OUTLINE**

**UPON SUCCESSFUL COMPLETION OF THIS COURSE THE APPRENTICE SHOULD BE ABLE TO PERFORM THE  
FOLLOWING OUTCOMES AND OBJECTIVES.**

**SECTION ONE: .....INTERMEDIATE THEORY: LOW SLOPE MEMBRANES.....48 HOURS**

**A. Safety ..... 12 Hours**

**Outcome:**       *Maintain safety standards as they pertain to the roofing industry.*

1.     Maintain safety standards pertaining to the roofing industry.
2.     Complete the industry approved "Torch Safety Course" which includes safe set-up and operation of LP gas torches, proper fire watch techniques and recording, and roof top site hazard assessments.

**B. Tools and Equipment – Operations ..... 1 Hour**

**Outcome:**       *Describe the safe operation of roofing equipment.*

1.     Describe the proper use of non-powered roofing equipment.
2.     Describe the safe operation of powered roofing equipment.

**C. Roofing Specifications ..... 1 Hour**

**Outcome:**       *List and explain the procedures and requirements for "good roofing practice".*

1.     Describe the various manuals available to maintain minimum standards.
2.     List and explain the minimum requirements.

**D. Roof Failures ..... 2 Hours**

**Outcome:**       *Describe examples and causes of roof failures.*

1.     Describe examples of roof failures.
2.     Explain environmental roof defects and the methods used to counteract them.
3.     Explain the methods used in leak detection.
4.     List the steps taken to repair existing roofs.



**E. Re-roofing ..... 2 Hours**

**Outcome:** *Describe the sequences and safety factors regarding re-roofing existing structures.*

1. List and describe the steps to re-roof an existing building.
2. Explain the special safety issues with regard to re-roofing focusing on site hazard assessments and environmental hazards.

**F. Waterproofing and Dampproofing ..... 2 Hours**

**Outcome:** *Describe the materials used and the methods of waterproofing and dampproofing.*

1. Explain the need for waterproofing/dampproofing and the difference between the two systems.
2. List and describe the materials used in the processes.
3. Explain the special safety requirements for working "below grade" or "confined space".

**G. Hot Asphalt Application – Built-up Roofing – Introduction ..... 6 Hours**

**Outcome:** *Describe the application of built-up roofs in low slope roof situations.*

1. List and describe substrate requirements for built-up roofs.
2. Describe application methods of built-up roof membranes.
3. List and describe membrane protection requirements.

**H. Roofing Application for Other Membranes ..... 12 Hours**

**Outcome:** *Describe and identify different types of materials used for elasto-plastic membrane applications and their unique safe work practices.*

1. List and describe the different types of membranes used.
2. List and describe the application techniques unique to each system.
3. Identify the safety procedures used in the application of elasto-plastic systems.
4. Demonstrate an awareness of new technologies related to second year material.

**I. Roofing During Inclement Weather ..... 1 Hour**

**Outcome:** *Describe the techniques and precautions used when roofing during inclement weather.*

1. Describe the techniques used to cover open roof areas during sudden weather shifts.
2. List and describe the safety procedures and equipment used on roofs with icy conditions.
3. List special procedures used during cold-weather roofing.

**J. Roof Drainage..... 1 Hour**

**Outcome:** *Identify types and uses of roof drainage systems.*

1. Explain the differences between interior and exterior drainage systems.
2. List and describe the different types of roof drainage systems.

**K. Softwood Shakes ..... 4 Hours**

**Outcome:** *Describe the application techniques for softwood shakes.*

1. Describe the types and grades of softwood shakes.
2. Describe the application for new roofing and re-roofing with softwood shakes.
3. Identify safety procedures and equipment when applying softwood shakes.

**L. Rigging..... 4 Hours**

**Outcome:** *Identify and understand the safe use of rigging equipment.*

1. Understand the relevant laws with regard to rigging and rigging equipment as dictated by W.H.&S.
2. List and describe the various types of rigging equipment.
3. Identify and understand the use of hand signals.
4. List and describe knots and splices.

**SECTION TWO:..... SHOP WORK: DETAIL WORK & STEEP ROOFING .....96 HOURS**

**A. Safety ..... 8 Hours**

**Outcome:** *Demonstrate safe work practices as it applies to shop work.*

1. Demonstrate safe work practices in shop work pertaining to regulation changes.
2. Demonstrate proper use of Personal Protective Equipment (PPE).

**B. Tools and Equipment..... Ongoing**

**Outcome:** *Demonstrate proficiency in the use of tools and equipment.*

1. Demonstrate the practical application of hand tools and equipment.
2. Demonstrate the safe use of powered equipment.

**C. Low Slope Roof Applications..... 40 Hours****Outcome:**     *Practice and demonstrate aptitude in the application of low slope membrane.*

1. Demonstrate safe handling and use of hand tools specific to low slope membranes. (SBS/APP, EPDM, PVC, BUR).
2. Demonstrate proper application methods for low slope membranes.
3. Demonstrate proper methodology waterproofing penetrations on low slope roofs.

**D. Rigging and Rigging Equipment..... 10 Hours****Outcome:**     *Practice and demonstrate the proper use and handling of rigging equipment.*

1. Demonstrate proficiency in the assembly and disassembly of various hoists used in the industry.
2. Demonstrate the proper use of proper hoisting signals.
3. Demonstrate ability to work with ropes (knots and splices) pertaining to the trade.

**E. Steep Roof Applications..... 38 Hours****Outcome:**     *Practice and demonstrate aptitude in the application of steep slope membrane.*

1. Demonstrate safe handling and use of hand tools specific to steep slope membranes. (Softwood shakes, laminated/architectural shingles).
2. Demonstrate proper application of flashings, underlayment and eave protection specific to steep roof systems.
3. Demonstrate proper application methods of steep slope membranes.

**SECTION THREE:..... TRADE MATHEMATICS: INTRODUCTORY GEOMETRY ..... 18 HOURS****A. Mathematics ..... 9 Hours****Outcome:**     *Solve mathematical problems using basic arithmetic.*

1. Solve mathematical problems using basic mathematics.
2. Solve problems using geometry.
3. Solve geometrical problems using Pythagorean Theory and square roots.

**B. Estimating..... 9 Hours****Outcome:**     *Estimate material take-offs.*

1. Estimate material take-off on steep roof situations using imperial dimensions.
2. Estimate material take-offs using metric dimensions.

**SECTION FOUR: ..... INTERPRETING BLUEPRINTS ..... 18 HOURS****A. Blueprint Interpretation ..... 6 Hours**

**Outcome:**        *Demonstrate ability to gather relevant information from actual blueprints.*

1.     Demonstrate ability to gather roofing information from working blueprints.
2.     Demonstrate ability to read and interpret specifications.

**B. Construction Details ..... 12 Hours**

**Outcome:**        *Scale and draw various roofing details.*

1.     Demonstrate ability to pictorially depict roofing details.
2.     Demonstrate ability to scale drawings and details.



**THIRD PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
COURSE OUTLINE**

**UPON SUCCESSFUL COMPLETION OF THIS COURSE THE APPRENTICE SHOULD BE ABLE TO PERFORM THE  
FOLLOWING OUTCOMES AND OBJECTIVES.**

**SECTION ONE: .....ADVANCED THEORY & METAL ROOFING..... 44 HOURS**

**A. Safety ..... 5 Hours**

**Outcome:**      *Maintain safety standards as they pertain to the roofing industry.*

1. Describe safety standards as they pertain to the roofing industry.
2. Understand the requirements of safety related to employees, employers and other trades.
3. Understand the safety standards related to roofing and the public.
4. Complete industry approved "Fire Risk Management" course, which includes hazard assessment and checklist/log recording.

**B. Metal Roof..... 6 Hours**

**Outcome:**      *List and explain the types and application procedures for metal roofing.*

1. List the various types of metal roofs.
2. Describe the application techniques and requirements for metal roofs.
3. List and describe the tools and equipment used for installation.

**C. Preventive Roof Maintenance ..... 2 Hours**

**Outcome:**      *Describe and understand preventive maintenance.*

1. Explain environmental roof defects and the methods used to counteract them.
2. Explain the methods used in leak detection.
3. List the steps taken to repair existing roofs.
4. Explain the requirements of a roof survey.

**D. Trade Science ..... 9 Hours**

**Outcome:**      *Describe the physical and chemical classifications of roofing components.*

1. List and describe the chemical classifications of roof insulations.
2. Describe types of roof venting.
3. List and describe the physical properties of roof decks.

**E. Organizing The Roofing Crew..... 12 Hours**

**Outcome:** *Understand the duties and responsibilities of various members of a roofing crew.  
Explain the role of the industry network system.*

1. List and describe the various members of a roofing crew; both direct and indirect.
2. Demonstrate effective and efficient use of materials and labour on a roofing crew.
3. Understand and participate in "Workplace Coaching Skills" program.
4. Explain the role and purpose of the PAC (Provincial Apprenticeship Committee) in the roofer trade.

**F. Steep Roofing Materials – Tiles ..... 6 Hours**

**Outcome:** *Describe the application of steep slope roofing tiles and slates.*

1. List and describe substrate requirements for concrete and metal tiles.
2. Describe application methods for concrete and metal tiles.
3. List and describe safety procedures for working on tile roofs.

**G. Flashings and Accessories ..... 4 Hours**

**Outcome:** *Describe and identify different types of materials used for the fabrication and application of metal flashings.*

1. List and describe the different types of metals used for flashings.
2. Describe the techniques used for fabrication and layout.
3. Describe the minimum requirements for the application of metal flashings.

**SECTION TWO:..... SHOP WORK: METAL ROOFING & FLASHING .....96 HOURS****A. Safety ..... 8 Hours**

**Outcome:** *Demonstrate safe work practices as it applies to shop work.*

1. Demonstrate safe work practices in shop work as it pertains to changes in regulations.
2. Demonstrate proper use of Personal Protective Equipment (PPE).

**B. New Materials ..... 12 Hours**

**Outcome:** *Practice and demonstrate aptitude in the application of new materials or systems.*

1. Demonstrate safe handling and use of new roofing systems or materials as introduced (i.e. TPO, CSPE).
2. Demonstrate proper application methods of new membranes.
3. Demonstrate proper safety procedures of new systems.

**C. Steep Roof Applications..... 16 Hours**

**Outcome:**     *Practice and demonstrate aptitude in the application of steep slope systems i.e. concrete tiles, metal tiles.*

1. Demonstrate safe handling and use of hand tools specific to steep slope membranes (concrete tiles, metal tiles).
2. Demonstrate proper application of flashings, underlayment and eave protection specific to steep roof systems.
3. Demonstrate proper application methods of steep slope membranes.

**D. Maintenance ..... 6 Hours**

**Outcome:**     *Describe and perform maintenance tasks to roofing equipment.*

1. Perform routine on-deck maintenance to roofing equipment.
2. Demonstrate proper techniques to perform maintenance on small engines.
3. Describe troubleshooting routines on small engines.

**E. Metal Roofs..... 20 Hours**

**Outcome:**     *Demonstrate ability to apply metals roofs.*

1. Describe and properly utilize metal roofing safety equipment.
2. Demonstrate ability to apply underlayment and eave protection.
3. Demonstrate ability to properly install metal roofing and associated flashings.

**F. Sheet Metal Shop Work ..... 34 Hours**

**Outcome:**     *Demonstrate ability to fabricate and install metal flashings.*

1. Describe and properly utilize metal flashing fabrication equipment safely.
2. Demonstrate ability to layout and fabricate metal flashings.
3. Demonstrate ability to properly install metal flashings on the roof.

**SECTION THREE:..... TRADE MATHEMATICS: ADVANCED GEOMETRY & MATERIAL TAKE-OFFS.....20 HOURS****A. Mathematics ..... 20 Hours**

**Outcome:**     *Estimate material for various roof styles and materials.*

1. Solve mathematical problems using basic mathematics.
2. Estimate materials for low slope roof covered with various materials.
3. Estimate flashing amounts on low slope roofs.

**SECTION FOUR: ..... BLUEPRINT READING: ESTIMATING ..... 20 HOURS****A. Blueprint Interpretation ..... 20 Hours**

**Outcome:**      *Demonstrate ability to list on-site requirements using blueprints and specifications.*

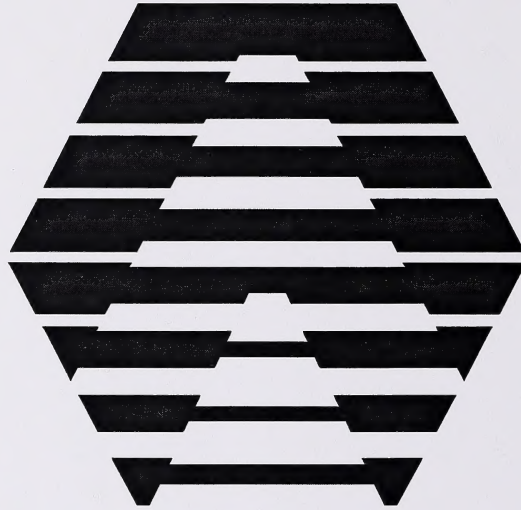
1.      Demonstrate ability to list roofing materials and information from working blueprints.
2.      Demonstrate ability to read and interpret specifications used in conjunction with blueprints.











# Alberta Apprenticeship and Industry Training

*Excellence through training and experience*

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